KVM Tutorial

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Outline

- What is KVM
- Hardware virtualization
- Paravirtualization
- Libvirt tools
- Launching a set image from command line
- Installing custom virtualized machine via virt-install

What is KVM

- KVM=Kernel-based Virtual Machine
- A kernel module that allows userspace programs (such as QEMU) access to hardware virtualization features of processors.
- Invented at Qumranet, bought by RedHat
- Part of all stock kernels in RHEL/SL/Centos 5 and 6. Doesn't require special kernel for either host or guest.
- Has worked reliably since RHEL 5u4.
- Also available in SLES, Ubuntu, Gentoo
- The Xen hypervisor configuration not supported by Redhat (and thus not by SL) in RHEL6. KVM is the future.

Hardware Virtualization

- Most Linux hardware virtualization schemes (Xen-HVM, VirtualBox, KVM) use QEMU
- QEMU is a generic emulation program can present single devices or whole systems.
- Default x86-based virtual system sees CPU, IDE disk, RTL8139 network card, console (exported via VNC).
- Can “pass through” other PCI devices to virtualized machine as well
- Can use SR-IOV to share one PCI device on the host with a number of virtual machines.

Paravirtualization

- Paravirtualization uses special disk and network drivers in the host virtual machine that take advantage of knowing the underlying hardware.
- Originally only available in Xen virtual machines
- Now “virtio” disk and network drivers available in KVM as well, for guest Linux and Windows operating systems.
- Can drive network at wire speed, disk at hardware limits, although CPU usage may be more than bare metal.

Libvirt tools

- Libvirt is a generic virtualization management layer developed by Redhat
- Most commonly used to start, stop and manage virtual machines
- Can also define virtual networks, virtual storage.
- Command line tools: virsh create, virsh start, virsh destroy
- Installation tool, virt-install
- GUI, virt-manager

Hands-on part 1, launch set image from command line

See http://cernvm.cern.ch/portal/kvm

This is a tutorial how to take the pre-packaged CernVM virtual image and launch it under KVM

On same site there is description how to do the same for Xen,VMWare, VirtualBox.

Hands-on part 1, continued

```
<domain type='kvm'>
        <name>CernVM-2.4.0-x86_64</name>
        <memory>524288</memory>
        <os>
                <type arch='x86_64'>hvm</type>
                <boot dev='hd'/>
        </os>
        <devices>
                <disk type='file' device='disk'>
                        <source file='/home/timm/cernvm-desktop-2.4.0-1.1-1-x86_64.hdd' />
                        <target dev='hda'/>
                </disk>
                <interface type='network'>
                        <source network='default'/>
                        <model type='virtio'/>
                </interface>

                <graphics type='vnc' listen='0.0.0.0' port='6019'/>
         </devices>
</domain>
```

Hands-on part 2, install your own image

virt-install --connect=qemu:///system --keymap=en-us --accelerate --network bridge:br0 --name=fcl002k3 --ram=1000 --vcpus=1 --mac=54:52:00:02:02:03 --os-type=linux --file=/dev/LG2/LV5 --location=http://linux1.fnal.gov/linux/slf55/x86_64/sites/Fermi

Substitute as needed with your own name, MAC address, network settings, and device.